



FLEXSINE 120

Air Cooled Sine Wave Filters

6 - 120 Hz

Selection Brochure | S120F Sine Wave Filters

Prepare for the Future without Sacrificing the Present

One Filter.
Induction and PM Motors.
No De-rate.

Motor advances are driving the market to make the switch to faster spinning, higher efficiency PM motors. These higher speeds lead to higher frequency harmonic distortion at the output of the drive, forcing de-rating of competitors sine wave filters, and leading them to require switching frequencies that de-rate the drive. The **FlexSine 120 Sine Wave Filters** allow for:

- **One filter for both Induction and PM Motors**
- **No de-rating of the filter up to 120 Hz** (180 Hz with minimal de-rating)
- **No drive de-rate** due to lower switching frequencies
- **Low Audible Noise**



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Buy for Today. Plan for Tomorrow.

In addition to being a low cost 60 Hz sine wave filter, the FlexSine 120 product line can operate at fundamental frequencies up to 120 Hz without de-rating (180 Hz with minimal de-rating). This allows for the use of line frequency induction motors with the ability to switch to high speed PM motors at any time without the need to de-rate the filter or drive.

FLEXSINE 120 HIGHLIGHTS

Single Design for IM and PM Motor Operation

The FlexSine 120 is the only sine wave filter designed specifically for operation with today's 60 Hz induction motor applications as well as tomorrow's high frequency permanent magnet (PM) motors.

Avoid Equipment De-rates At High Frequency

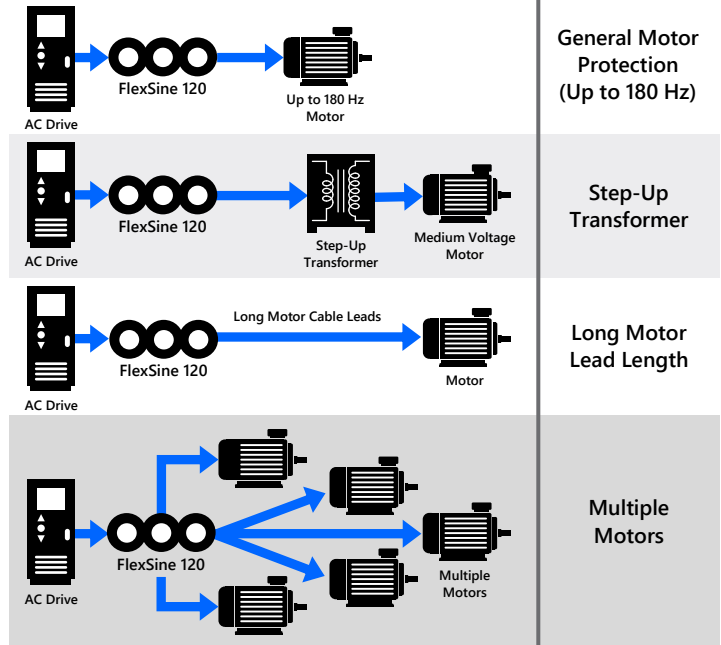
Competitors' solution to high frequency PM motors is to force you to buy a larger filter and switch the VFD at 5 kHz. Not only are you forced to pay more for the larger filter, the 5 kHz switching frequency de-rates the drive, increasing up-front costs further by requiring a larger drive.

The FlexSine 120 is different. Due to a unique patented design and proprietary materials, the FlexSine 120 allows you operate at 2.5 kHz, avoiding any drive de-rate. The FlexSine 120 also is rated at full current up to 120 Hz (up to 180 Hz with 0-15% de-rate).


Upgrade to PMM with Existing Equipment

The FlexSine 120 allows you to use your current drive to upgrade to PMM frequencies. Simply switch out your existing sine wave filter with an appropriately sized FlexSine filter to start reaping the benefits of PMM.

FILTER APPLICATIONS



PERFORMANCE SPECIFICATIONS

Harmonic Design	<5% @ 2.5 kHz
Voltage Range	Up to 500 V
Fundamental Frequency	6 - 120 Hz (Up to 180 Hz with de-rating)
Switching Frequency *	2.5 kHz Nominal 2.0 kHz Minimum (See FlexSine 120 Operating Range Chart)
Current Range	100 - 960 A
Overload Capability	150% rated current for 1 minute
Maximum Ambient Temperature	50 °C (122 °F) (Higher with de-rating)
Motor Cable Length	Up to 15,000 feet
Enclosure Options	Modular Panel NEMA 3R Cabinet
Agency Recognitions	 1446 Standard

* Thermal design to 2.0 kHz. Contact CTM for application verification.

SINE WAVE FILTER ADVANTAGES

Motor Protection

Harmful square waves, voltage spikes, and harmonic distortion are all filtered from the inverter output, reducing motor heating, wear, and winding stress, providing critical motor protection.

Maximum Motor Lead Length

Reflected voltage waves occur when motor lead lengths reach or exceed a characteristic length of the system, which is dependent on the voltage rise times (dV/dt) in the cabling. By filtering the PWM waveform to a near perfect sinusoidal waveform, CTM sine wave filters minimize dV/dt, allowing for longer motor lead lengths (up to 15,000 feet in certain applications).

Electric Fluting (Bearing Current)

Common-mode (bearing) current can have disastrous effects on induction motors, leading to electric fluting and premature bearing failure. CTM offers the only sine wave filters that do not introduce common-mode currents.

Low Audible Noise

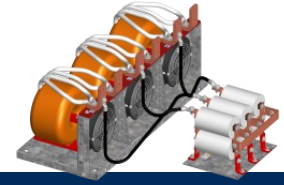
Due to superior materials and geometric shapes, magnetostriction-induced noise is significantly lower in CTM filters.

Integrated Thermal Management

CTM FlexSine filters are outfitted with fans for thermal management and low operating temperature.

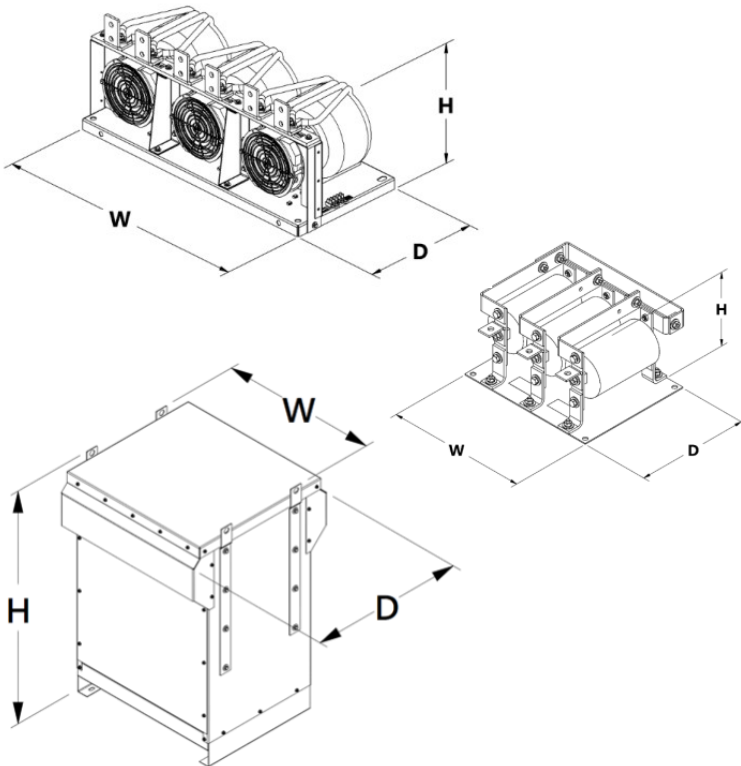
ELECTRICAL AND MECHANICAL SPECIFICATIONS:

Size filter based on the Full Load Amps (FLA) of the drive. The filter current rating must be greater than or equal to the FLA. Order filters by CTM Part Number online at ctmmagnetics.com/contact-us, or call us directly at [480.967.9447](tel:480.967.9447).

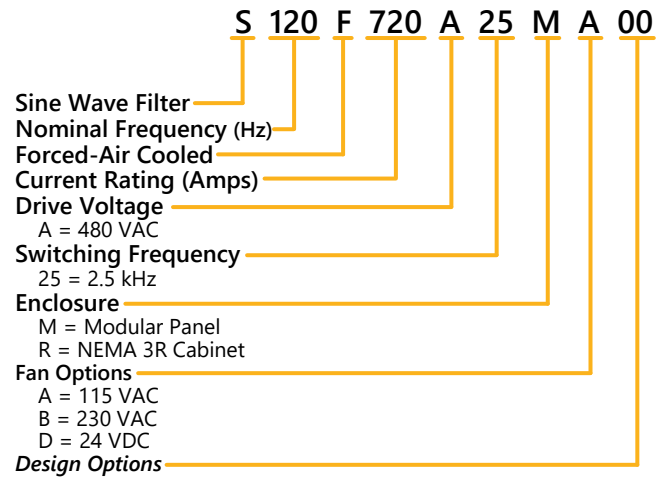


Rated Current (A _{RMS})	Est. Motor HP ¹	Fund. Frequency De-rating		Modular Panel				NEMA 3R Cabinet		
		150 Hz	180 Hz	Part Number ²	Size (W x D x H)		Approx. Weight (lbs)	Part Number ²	Size (W x D x H) (in)	Approx. Weight (lbs)
					Reactor (in)	Cap. Panel (in)				
100	75	100%	95%	S120F100A25MA00	24.0 x 12.0 x 12.7	11.0 x 8.9 x 5.9	61	S120F100A25RA00	39.3 x 40.5 x 54.5	361
130	100	100%	95%	S120F130A25MA00	24.0 x 12.0 x 12.7	11.0 x 8.9 x 5.9	70	S120F130A25RA00	39.3 x 40.5 x 54.5	370
160	125	95%	90%	S120F160A25MA00	24.0 x 12.0 x 12.7	11.0 x 8.9 x 5.9	83	S120F160A25RA00	39.3 x 40.5 x 54.5	383
200	150	100%	95%	S120F200A25MA00	24.0 x 12.0 x 12.7	11.0 x 9.5 x 5.9	87	S120F200A25RA00	39.3 x 40.5 x 54.5	387
240	200	100%	95%	S120F240A25MA00	24.0 x 12.0 x 12.7	11.0 x 9.5 x 5.9	100	S120F240A25RA00	39.3 x 40.5 x 54.5	400
300	250	95%	90%	S120F300A25MA00	24.0 x 12.0 x 12.7	11.0 x 8.9 x 12.1	110	S120F300A25RA00	39.3 x 40.5 x 54.5	410
360	300	100%	100%	S120F360A25MA00	28.0 x 12.6 x 12.7	11.0 x 8.9 x 12.1	145	S120F360A25RA00	39.3 x 40.5 x 54.5	445
420	350	100%	90%	S120F420A25MA00	28.0 x 12.6 x 12.7	11.0 x 9.5 x 8.6	148	S120F420A25RA00	39.3 x 40.5 x 54.5	451
480	400	90%	85%	S120F480A25MA00	28.0 x 12.6 x 12.7	11.0 x 9.5 x 8.6	158	S120F480A25RA00	39.3 x 40.5 x 54.5	458
540	450	95%	90%	S120F540A25MA00	31.0 x 13.0 x 13.8	11.0 x 9.5 x 8.6	200	S120F540A25RA00	39.3 x 40.5 x 54.5	494
600	500	95%	85%	S120F600A25MA00	31.0 x 13.0 x 13.8	11.0 x 9.5 x 12.1	200	S120F600A25RA00	39.3 x 40.5 x 54.5	500
720	600	100%	90%	S120F720A25MA00	36.0 x 14.0 x 16.8	11.0 x 9.5 x 12.1	237	S120F720A25RA00	39.3 x 40.5 x 54.5	537
840	700	100%	95%	S120F840A25MA00	36.0 x 14.0 x 16.8	21.5 x 9.5 x 8.6	286	S120F840A25RA00	39.3 x 40.5 x 54.5	586
960	800	95%	90%	S120F960A25MA00	36.0 x 14.0 x 16.8	21.5 x 9.5 x 8.6	291	S120F960A25RA00	39.3 x 40.5 x 54.5	591

¹ Motor HP estimated based on typical conditions. Actual HP will vary with application. Size filter based on drive FLA.
² Use part number table (bottom right) for additional options.

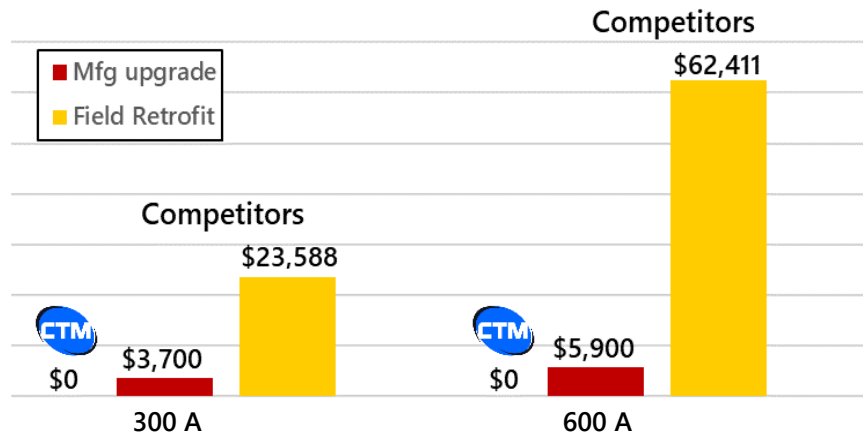


Part Number System



Note: Information is for reference only. Data subject to change without notice.

COST TO UPGRADE TO 120 Hz



Following our competitor recommendations, upgrading to 120 Hz can be a costly endeavor, with filter de-rates of at least 25% and drive de-rates of at least 20% (due to the recommended 5 kHz switching frequency). These recommendations become even more costly with field retrofits, as the drive and filter are essentially scrapped.

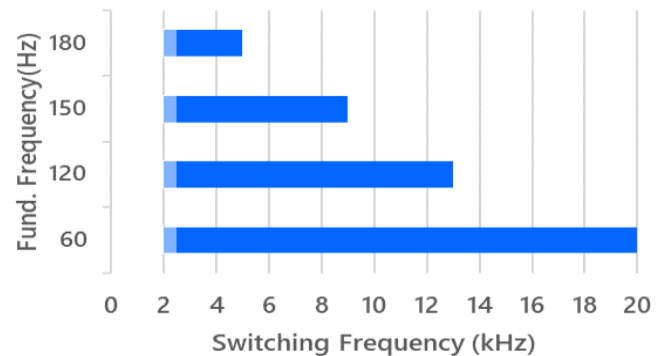
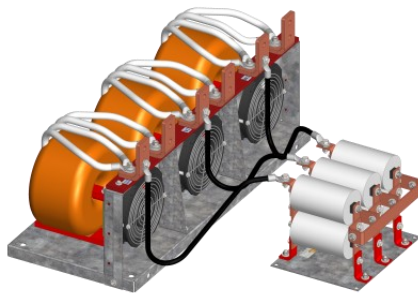
However, there is another option. By installing a CTM FlexSine 120 filter now, you not only get the benefits of a low cost 60 Hz sine wave filter, you also unlock the ability to upgrade to a 120 Hz PM motor at no additional cost, whether that is an initial or future plan. Buy for today, be prepared for tomorrow.

- Manufacturing upgrade is based on 25% filter and 20% VFD de-rate to achieve 120 Hz.
- Field retrofit estimate requires a new filter and new VFD to meet full power based on de-rate above.

FLEXSINE 120 OPERATING RANGE

The FlexSine 120 product line is electrically designed to provide -17 dB attenuation at a switching frequency of 2.5 kHz. The product line is thermally designed to operate at 120 Hz and minimum 2 kHz switching frequency. The chart to the right displays the maximum switching frequencies at various fundamental frequencies.

With an operating switching frequency of 2.0 kHz the attenuation drops to -12.4 dB and allows for more harmonic distortion at the output of the filter. It is up to the customer to determine if this is an appropriate amount of filtering for the application.



■ Thermal Rating ■ Recommended Operating Range



Scan for CTM Contact Information:



Additional information is available online:

ctmmagnetics.com

Contact us online at:

ctmmagnetics.com/contact-us

Final product specifications subject to change